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## Defining wireworm risk with GIS

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# Defining wireworm risk with GIS

## **Abstract**

Research at Iowa State University recently helped develop an early warning system for Iowa fields "at risk" from wireworms, by using geographic information system (GIS) technology. This information should help producers returning Conservation Reserve Program (CRP) land to corn production locate their high-risk fields. They can then follow recommended scouting procedures and avoid significant amounts of unnecessary insecticide applications in fields where wireworms are not detected.

## **Keywords**

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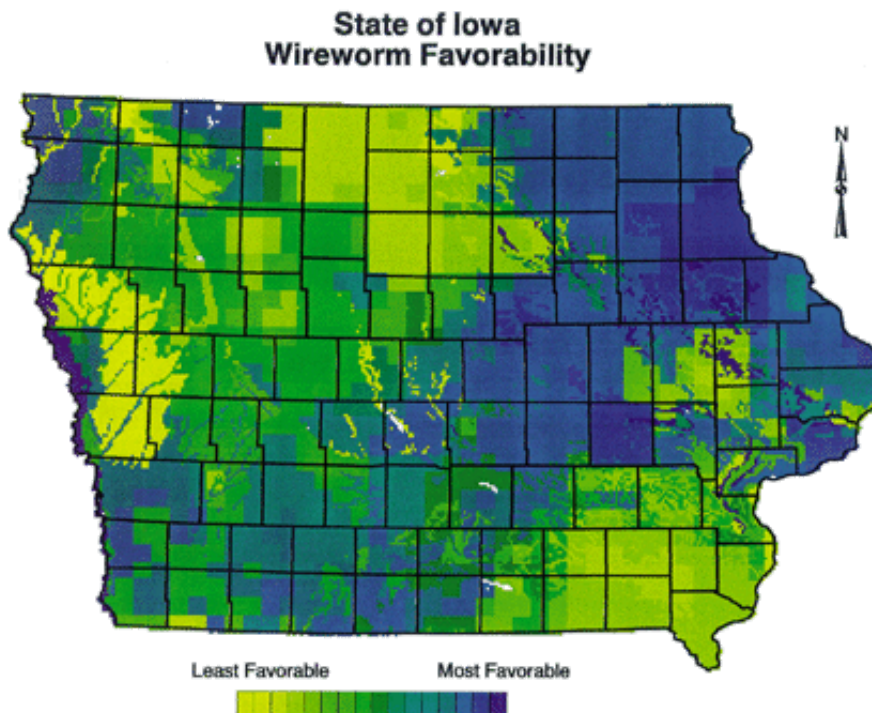
Agricultural Science | Agriculture | Entomology | Geographic Information Sciences

# INTEGRATED CROP MANAGEMENT

## Defining wireworm risk with GIS

Research at Iowa State University recently helped develop an early warning system for Iowa fields "at risk" from wireworms, by using geographic information system (GIS) technology. This information should help producers returning Conservation Reserve Program (CRP) land to corn production locate their high-risk fields. They can then follow recommended scouting procedures and avoid significant amounts of unnecessary insecticide applications in fields where wireworms are not detected.

Field studies were conducted during 1995 and 1996 in Audubon, Floyd, Harrison, Lucas, Monona, Muscatine, O'Brien, and Story counties. A total of 89 fields was sampled for wireworms. There were 15 wireworm species recovered from CRP fields, and 14 of these species are considered serious pests of corn. The distribution of wireworms in Iowa, and subsequent crop damage, probably are less restricted by environment than previously thought, primarily because of the relatively large species diversity. Thus, integrated pest management tactics such as scouting before planting will probably benefit the risk-averse grower in these newly converted lands.



The risk assessment portion of the study developed a method of predicting presence or absence of wireworms based on weather and characteristics of Iowa soils. A habitat

favorability model that encompasses water-balance and temperature components was then prepared and calibrated with actual field measurements.

The risk assessment model determined that the most useful variables were a soil-moisture threshold of 17 percent by weight and a moisture analysis that included meteorological data from the year before sampling occurred. These variables were coupled with a hydrologic model and embedded in a GIS framework. The model required daily precipitation and solar radiation coverages that were distributed over the entire state.

The GIS map produced with this computer model can be used as a guide for directing where wireworm sampling should be conducted. The methodology used in this analysis is simple, yet it performs the difficult task of combining time, space, and climatological variables to evaluate wireworm habitat over a landscape.

In the State of Iowa map, yellow indicates areas that are least favorable and darker shades of blue indicate areas that are most favorable for wireworm habitation. This scale is relative and **does not** predict the presence or density of wireworms, but it shows areas of greater potential where wireworm scouting may be economical. See [last week's newsletter](#) [1] for information on how to scout for wireworms.

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[1] <http://www.ipm.iastate.edu/ipm/icm//ipm/icm/..4-12-1999/wirewormbait.html>

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